FEBRUARY 5.

MR. CHARLES P. PEROT in the Chair.

Twenty-four persons present.

The death of George A. Rex, M.D., a member, on the 4th inst., was announced.

On a New Method of Studying Cell Motion.—CHARLES LESTER LEONARD, M.D. communicated notes of a lecture delivered January 15, 1895:—

Since the enunciation by Virchow, in 1858, of his theory of cellular pathology the attention of the scientific world has been centered about the study of this unit. Nearly all the unsolved problems of medical science involve, in one way or another, the consideration of some one of the functions of the cell.

It is my purpose in this paper to call attention to a new method of studying one of these functions. I have chosen as illustrations, some of the well-known facts of physiology already seen and described by competent observers, and have confined the greater part of my study to cell motion as exemplified in the movements of the red and white blood corpuscles.

The possibility of these studies was suggested by the successful result of an experiment in instantaneous photomicrography.

The method to be illustrated consists in the making of a consecutive series of instantaneous photomicrographs of the same microscopic field taken at definite intervals, and the comparative study of the series. The results obtained by this method are the elimination to a greater extent of the personal equation of the observer, the procuring of incontestable proof of phenomena observed, the extension of the observations over any length of time, and the possibility of studying the changes occurring over the entire field at any one moment. The method also enables the student to study the condition of a fresh, living, unstained specimen for any length of time, in fields taken at definite intervals.

The original magnifications were one and two-thousand diameters measured by the projection of a stage micrometer upon the screen; the lantern multiplies these diameters by forty, giving on the screen 40,000 and 80,000 diameters. The time of exposure was instantaneous, at least relatively with regard to the motion of the bodies, varying in different pictures from two, to one-fourth of a second.

The results obtained as regards the photomicrography of unstained

specimens is illustrated by six photomicrographs of human blood in the different forms which it assumes upon the warm stages.

The method of study is illustrated by the following series:—

Series A.—The amœboid motion of the white blood corpuscle. The change of shape and motion with relation to the surrounding stationary and identical fields is well marked.

Series B.—This series shows the power of the white blood corpuscle in forcing its way through a mass of red crenated and adherent blood corpuscles.

Series C.—Is of marked interest; a white corpuscle has seized upon a red corpuscle and a series of photomicrographs shows that it has dragged it through a considerable distance in a field which is proved to be stationary and identical in all the photomicrographs.

Series D.—This series shows motion in a red blood corpuscle, situated in a field in which the series proves no other motion took place during one-half hour. This motion must, therefore, have been produced by some inherent power in the red blood corpuscle, and as the photomicrographs show that no twist has occurred, the motion cannot be due to a previous torsion, and may therefore be considered a truly amœboid motion of the red blood corpuscle.

Series E. and *F.*—Show the diapedesis of the red blood corpuscle from a capillary in which the blood is in motion and from one in which there is stasis of the blood. This phenomenon, therefore, occurs under two opposite or nearly opposite conditions as regards intra-vascular blood pressure, indicating, perhaps, that diapedesis is not a filtration due to pressure, but is due to the amœboid motion and power of the red blood corpuscles.

Series G.—This series shows an empty capillary. Along the inner surface of its wall may be seen white corpuscles, in which the series indicates movement. The diapedesis of two red blood corpuscles from this empty capillary tends to strengthen the belief in the amœboid motion of the red blood corpuscle.

Further photomicrographs illustrate the position of the corpuscles within the capillaries, and show the presence of nuclei in the red corpuscles of the frog while in the living tissues. Different forms of the malarial plasmodia, and the application of the method to pathological studies are illustrated by other photomicrographs.

The pictures are not shown as the perfect results of this method, or as the outcome of research by it. They are simply to illustrate the author's method of studying cell motion. Inferences based on the pictures are foreign to the purpose of the communication, which is intended merely to demonstrate a method of study worthy of scientific consideration. Its usefulness in producing accurate illustrations, both for publication and for lantern slides, cannot be overestimated, as it supplies pictures whose counterpart can be found under the microscope.